

Peterson's Landing should not be abused to benefit a few people, but should be protected for the rights of *all* people.-- so that town residents may have *foot* access to the beautiful areas of salt marsh.

The conservation commission, chaired by Martin Delano, are unanimously opposed to driving non-emergency vehicles on this landing.

(The following article shows possible damage that could be done to the marshes by an indiscriminate use of non-emergency vehicles. --Ed.)

Our Salt Marshes: Facing Destruction?

By KAREN CHANDLER-MIDDLETON

"The dangers to salt marshes stem from human activities not natural processes."

-- Life and Death of the Salt Marsh
by John and Mildred Teal

North of Powder Point Bridge, Duxbury marsh spreads out thick and fertile behind the narrow spit of beach that forms our eastern shore. It is part of the larger system of intertidal marshes that have grown up along the New England coast in the wake of glaciers long since receded from our shores.

Like other New England marshes, ours is a thriving community of plants and animals, interacting in an environment that changes daily with the tides, and yearly with the seasons. Steep-sided tidal creeks meander through dense tall stands of grass that line their edges. Marsh wrens and seaside sparrows nest near the shore. Ducks abound, and further back among the grasses other wild birds feed and nest. Water lies in shallow pools, sunken in the marsh, where minnows, crabs and shellfish live. Communities of crickets, beetles, dragonflies and other insects live as well within the marsh. Large mammals, raccoons and otters frequent favorite spots.

Along the souther shoreline of Duxbury marsh, on the bank of the Back River, a narrow belt of salt marsh vegetation stretches from Old Cove Landing, east to Powder Point across Drew Salt Works Landing, Simeon Soule Landing and Clark Peterson's Landing. Upward from the low tide line, coarse, perennial salt marsh cordgrass, *Spartina alterniflora*, has seeded itself in sediments brought in on the flooding tide. Peat has formed where mud, sand and plant remains have, over the years, accumulated at the roots of the *Spartina*, building up the level of the marsh. Diatoms, microscopic algae, spread across the surface of the mud and peat, casting a golden and greenish hue. Blue-green algae form dense mats and ribbons of color beneath the *Spartina* leaves and along the banks of peat. Photosynthetic, purple sulfur bacteria, other key members of the marsh community, spread out in bright purple carpets just below the surface of the mud. Mud snails scrape across the soil, feeding on that mixture of bacteria and decaying plants that forms the marsh detritus. Ribbed mussels, half-buried in peat, filter algae from the water. Higher up, fiddler crabs scurry from their holes at low tide, feeding until the water turns and threatens to inundate their burrows.

Landward, where the level of the marsh has risen above high water on all but the new moon tides, finer textured salt marsh hay, *Spartina patens*, grows. Along the highest level of the hay, rushes grow. Rose mallow, seaside goldenrod and sea lavender blossom here, adding seasonal color and varied texture to an otherwise grey-green sea of salt marsh hay.

Twice daily, during the growing season, on the flood tide, fish and larval forms of other marine organism flow up the river, over the lower edges of the peat, feeding on the microscopic algae and detritus present in the marsh. Twice daily, on the ebb tide, water, rich in nutrients, drains seaward from the marsh, feeding the algae that form the basis of the coastal and oceanic food web.

In winter, ice forms thick crystals on the brown stubble of cordgrass, left after the leaves have washed away. Snow, sculpted by the wind, lies in miniature drifts on the upper marsh. At the seaward edges of the peat, ice pushed up by winter storms, lies heaped as jagged cakes, or is strewn across the lower portions of the marsh in broken pieces.

Come spring, however, the bright green shoots of cordgrass again begin to grow. From beneath the thick swirls of last year's salt marsh hay, tiny seedlings emerge. Animals, that left in autumn, return. Those that lay dormant beneath the mud and grass begin to feed. The cycle of marsh life begins once more.

As the years pass, the *Spartina alterniflora*, growing thick upon the layer of peat that lies below high water, is buffeted by coastal storms. Wave damage that would otherwise erode the shoreline is reduced. Tenacious roots in both the lower and upper marsh bind the soil together. The impervious layer of peat also prevents fresh water from draining off the higher ground and stabilizes the water table.

This narrow, vital band of vegetation is not, however, invincible. The elements and the abuse by us, the inhabitants of the town, threaten its existence. Northeast winds and winter storms drive waves and ice across the lower marsh. Sections of peat have eroded in spots along the shore just down from Powder Point. During the summer and fall, short,

sharp waves sent from motor boats and water skiers cut through layers of peat as well, destroying old and newer sections of the marsh.

By far the greatest damage has occurred further west, at Peterson's Landing, a section of town-owned beach and marsh that spreads bayward from the public way. Where salt marsh hay formerly grew thick enough for harvest, and the cordgrass flourished along the water line, no vegetation grows. The marsh has disappeared. In its place, a barren stretch of sand and pebbles, scarred with tire tracks, lies exposed to wind and wave erosion.

What has caused the deterioration of the marsh? Natural erosion? Yes, to some extent. Previous traffic during those years of "haying" on the marsh no doubt resulted in some destruction at the time. Pedestrian traffic by townspeople eager for the shellfish that lie buried beyond the marsh must also have had impact. Hunters too, frequent the area. It appears, however, that major damage has been done by trucks that drive back and forth across the marsh.

Last summer, Lester Smith Jr., a coastal geologist working with the Provincetown Center for Coastal Studies, conducted an initial impact study on the site. Referring to the now barren stretch of land, he states:

In intertidal areas with similar physical characteristics to that of the sand-pebble area..., salt marsh deposits are usually found. Similar intertidal areas bordering the Back River are vegetated with salt marsh. The coincidence of the bare zone with the Public Way and the area of vehicular traffic strongly suggests that the salt marsh was present in this area in the past and was destroyed by vehicle impact. Scientific studies conducted on ecosystems on the Cape Cod National Seashore found that the intertidal salt marshes and sand flats are the most severely affected of coastal ecosystems by vehicle impacts. It was shown that 25 passes through a 3 meter wide area crushed and killed all the existing plants.

It is surprising that such vehicle traffic has occurred at Peterson's Landing. In a 1975 report submitted by the Town Landing Study Committee, and again in a 1978 Open Space and Recreation Plan, Peterson's Landing was recommended as a "foot landing," an "emergency access only for rescue vehicles." Why then, the trucks?

Fortunately, the damage can be repaired. Smith recommends "closure of the bare sand-pebble area." Following this, the cordgrass will recolonize the lower marsh area inundated by the tide. Seed, self-sown in autumn, that lie buried in the mud and sand all winter; will germinate in spring in the warmth and the saltwater diluted by abundant rains. Established neighboring plants will send out creeping underground stems. Aerial stems and leaves will soon emerge in the now barren ground.

The salt marsh hay of the upper marsh, however, cannot be expected to return so soon. Smith recommends:

...a short biological feasibility study be initiated to determine the optimum methods for planting this area of plant material. Following this short analysis, acquisition of plant material, supervision of planting and monitoring the results would be required. To allow continued pedestrian access across this area may require the construction of an elevated walkway.

Thus, given time, the scars will heal at Peterson's Landing. Now, however, that barren stretch of sand and pebbles serves as a harsh reminder of the damage done to nature's delicate ecosystem by our lack of understanding and disregard for the marsh. It is sadly ironic that in our rush to fish the bay and enjoy its beaches, that we threaten to destroy the very things we love about Duxbury: the plants and animals on the marsh, the fish and shellfish that are fed by its nutrients, and the very shoreline it protects. We, as a town, would do well to consider the offer made by Smith in his report: "If the Provincetown Center for Coastal Studies can be of any additional assistance in your efforts, we would be happy to do so."